

Basics of Lift Station Maintenance

Wastewater lift stations have electronic controls, pumps and valves that operate in a toxic and corrosive environment. Components are under continuous physical stress. Generally speaking, many lift stations have to be rebuilt every 15 to 25 years. It may be necessary to rebuild higher capacity pumps much more frequently. Routine maintenance of lift stations can help reduce costly repair bills or equipment failures.

Safety first

In my opinion, there are some very basic things all operators need to do as part of routine maintenance of lift stations. The first and most important is to practice safety. Remember to lock-out, tag-out while working on electrical components or moving parts such as pumps and motors. Fall protection and personal protective equipment such as gloves, safety glasses and other equipment is essential to safely work on wastewater lift stations.



David Snow of the city of Logan locks and tags out of the electrical supply at a lift station.

Operation and maintenance

The second is to be familiar with the operation and maintenance guide provided by most lift station manufacturers. Read and be familiar with recommended schedules for lubrication and adjustments. Some manufacturers suggest that lift stations should receive maintenance based on time, such as every month. Others may recommend maintenance after certain periods of operating time. Some require oil to be changed and some need grease. Certain lift stations need to have the clearance of impellers adjusted while others suggest replacement of impellers.

I assisted a system in replacing impellers that were so worn they were causing the pumps to run more than double time compared to when the pumps were new. Running double time is expensive in the waste of electrical power. Also, be aware that the volute may need to be replaced as they do wear causing excessive clearance and will also increase run times.



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David Snow and Rick Runnion of city of Logan adjust impeller clearance for proper operation of the lift station.

Installation of an hour meter on each motor will provide an accurate record of how often each motor is cycling and thus, the amount of water being pumped through the system. A record of the motor hours, dates and maintenance performed should be kept. Keeping track of lift station hours and when the maintenance is to be scheduled will help reduce chances of breakdowns. Breakdowns may cause sanitary sewer overflows (SSOs). SSOs need to be reported to the regulatory agency (the Kansas Dept. of Health and Environment) on the proper Incident Report form. Tracking lift station pump hours should be done daily in my opinion, but no less than three times per week. Lift station pump hour meters are as varied as are water meters. Some are manual read. Some utilize telemetry that can provide notices to smart phones or into SCADA systems of hours operated. Either way, these hours can be incorporated into the maintenance schedule of the lift station.

Maintenance such as adding grease control will vary depending on the

Keeping track of lift station hours and when the maintenance is to be scheduled will help reduce chances of breakdowns.

system and location. Lift stations for most residential customers may never or only occasionally need grease control. But those that serve commercial areas, especially those with restaurants, may need weekly or daily doses of grease control. Just adding grease control isn't enough. The floats need to be raised and any grease build up needs to be removed. Other types of controls may also have issues with grease or soap accumulation. Ask the supplier and read the maintenance manual for your system's specific controls.

I suggest that all lift stations should be cleaned at least annually to remove grease and grit and other debris. This is usually accomplished with a combination sewer cleaner/vacuum truck. Recently a system operator contacted me concerning an issue of increased operating time of a lift station. It varied from one hour to six hours or even longer. My first question was "Do you have an inflow and infiltration issue?" The operator replied that was not the case as the increased run-time occurs regularly. I asked if there was any increase in water use in the community. The operator replied that was none was evident. I went to the system and reviewed the situation. We found pieces of soap



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and grease getting into the pumps and causing partial blockage. A contractor cleaned the lift station and both of the pumps returned to normal operating hours.

Valves and pressure gauges

Don't forget other parts of the lift station such as check valves. Check valves can fail due to wear; sometimes valves become partially or fully plugged with debris. With either situation, water can recirculate as it is pumped from the wet-well to the force main and then flow back through the failed or clogged check valve into the wet-well. I recently worked with a system that had to replace the check valves as well as the operating valves.

The operating valves were butterfly valves; debris was caught on the disc. I believe the debris also caused a blockage of the check valve as the two valves were connected. The system replaced the butterfly valves with full-opening gate valves and new check valves. Residents in the area of the lift station had complained about odors,



Debris on a check valve can cause increased operating times.

become plugged with debris and give false readings. For example, a new lift station has a PSI of 24 pounds when each pump is operated. This is checked every year and after several years it is noticed that the pressure has increased to 35 PSI. This is indicator that the force main may be partially blocked and needs to be cleaned. By contrast, if pressure drops it may be due to a line break or hole in the force main or pump impellers may need to be replaced. It is a general recommendation to clean force mains every five years. Check your system's design operation and maintenance

manual for recommended time frames to clean the lines. Some systems do this annually after experiencing issues caused by a plugged force main.

obviously due to so much sewage being held in the lift station and the receiving manhole. Since the replacement of the valves in the lift station, complaints have diminished. That same city is also planning to extend the force main another 2,000 feet so the force main does not discharge into a manhole inside the city in another effort to help reduce potential odors.

A pressure gauge is a very useful tool for diagnosing lift station issues. When a lift station is new a pressure gauge placed on the force main will provide needed information. Make sure there is way to remove or clean the connections to the gauge so the gauge does not

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I want to encourage all operators and owners of wastewater systems to attend the 2017 KRWA Annual Conference & Exhibition in Wichita, March 28 - 30. There is a variety of great training sessions on wastewater topics – and the EXPO Hall at the KRWA conference features many products or services for the wastewater industry. Check the program in this issue or also online at <http://www.krwa.net/conference>.

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